Bangladesh Crit Care J September 2019; 7 (2): 116-117

Clinical Image

A case of Leaking Abdominal Aortic Aneurysm

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78 years old diabetic, hypertensive male patient, a known case of recent Non ST Elevated Myocardial Infarction (NSTEMI), Abdominal Aortic Aneurysm (measuring 7.7x4.2 cm) by recent ultrasound examination, admitted to general ICU through Emergency Room with the complaints of pain around left hypochondriac region for 4 hours. The pain was sharp aching over left upper abdomen, started suddenly with no radiation to any other site. There is no history of fever, nausea, vomiting or constipation. On general examination patient was conscious, oriented but toxic appearing with Anemia (+), Blood Pressure-80/50 mm of Hg, Pulse- 110 bpm but with feeble radial pulse, SpO_2-95% with 3 L O_2 through nasal cannula and urine output was scanty. Abdomen was soft, mildly distended and tender at left lumber region, pulsatile intra-abdominal smooth mass at left hypochondriac region and bowel sounds were present. Digital rectal examination showed an empty rectum. Respiratory system examination was unremarkable. An urgent CT scan of abdomen with IV contrast was done and it showed fusiform Abdominal Aortic Aneurysm (Fig 1 Arrow) distal to renal arteries with leaking of blood from its left lateral wall (Fig 2 Arrow).

Immediately consultation was taken from vascular surgeon and patient was advised to have endovascular aneurysm repair but patient‘s family refused to do any intervention. Renal function was deteriorating gradually (with elevated creatinine and urea level) due to inadequate urine output. Nephrology consultation was taken and patient was advised to have Sustained Low Efficiency Dialysis (SLED) but it was too late. Patient deteriorated rapidly and needed ET tube intubation for Type 1 respiratory failure, had severe metabolic acidosis and there was no recordable blood pressure which required inotrope support. Same day he went into cardiac arrest with asystole. CPR was unsuccessful.

Figure 1:

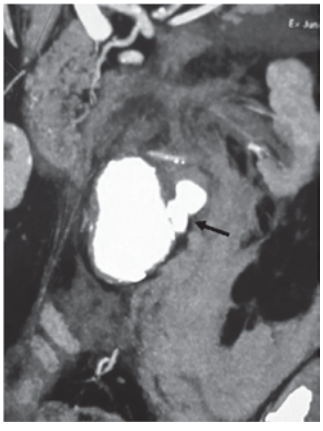

Figure 2:

DISCUSSION:

Abdominal Aortic Aneurysm (AAA) frequently presents with subtle and non-specific signs, yet diagnosis of aneurysms is crucial because of the catastrophic complications that can occur. AAA rupture has a mortality rate of 81%[1], and interventions such as endovascular aneurysm repair or open surgery are performed to prevent rupture when the risk of rupture is significant[2]. The pathogenesis of AAA is a multifactorial process with 85 underlying genetic, inflammatory and autoimmune components[3,4]. After an aneurysm has formed, many factors associated with greater risk of rupture have been identified including maximum diameter of the aneurysm, rate of increase in aneurysm size, hypertension, age, smoking history, COPD, bronchiectasis, and family history of aneurysms[5 -7].

The most common location for an AAA is the infra renal segment with suprarenal involvement in only 5% of the cases. The simultaneous presentation in other territories is a frequent occurrence with thoracic, iliac or peripheral aneurysms being detected in 12%, 25% and 3.5% of the patients respectively. The femoro popliteal aneurysm can be accompanied by an AAA in up to 70% of the cases.

Among all factors, the maximum AAA diameter remains the most widespread criterion to predict risk of AAA rupture [2,7]. There is a direct relationship between the size of the aneurysm and risk of rupture, although size alone is not an adequate predictor. Other parameters, including AAA expansion rate, intraluminal thrombus thickness, and wall stress, all play a role[2]. Even in asymptomatic unruptured aneurysms, repair of the aneurysm is indicated when the aneurysm exceeds 5.5 cm in size in patients with an acceptable surgical risk[8].

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Received : December 14, 2018; Accepted : January 14, 2019

In recent years, ultrasound has become an increasingly useful modality for the initial detection and size measurement of AAA and has been shown to have a sensitivity of 98.9% and a specificity of 99%[9,10]. For patients in whom AAA is suspected, ultrasound is the preferred initial imaging test and may be conducted at bedside[2,9]. Although ultrasound is useful for identifying aneurysms, it has limited ability to characterize features of impending rupture. In some cases, the usefulness of ultrasound may be limited by the patient's body habitus or bowel gas may obscure visualization of the abdominal aorta[10-11].

Generally, CT scan with IV contrast is the preferred imaging modality when an AAA has been identified on ultrasound or when the patient is experiencing severe symptoms, a pulsatile abdominal mass or has significant risk factors for AAA[2]. CT with contrast and MRI are accurate noninvasive test to determine the location and size of abdominal aortic aneurysm. Contrast aortography may be used for the evaluation of patients with aneurysms.

With the administration of IV contrast, aneurysms often reveal a patent lumen with thrombus lining the walls of the aneurysm. The mural thrombus is believed to be protective from rupture and a thinner mural thrombus is associated with higher rupture risk[12]. In cases of impending rupture, the contrast-enhanced blood may be seen penetrating into mural thrombus lining the aneurysm.

If blood transits beyond the mural thrombus, it may travel along the intimal margin of the aorta and perfuse the periphery of the organized thrombus[13]. This produces the 'hyper attenuating crescent' sign. The hyper attenuating crescent sign has a sensitivity of 77% and specificity of 93% for rupture, pseudo aneurysm formation or intramural hematoma found at the time of surgery[14].

After extending through the mural thrombus, blood may begin to leak through the vessel wall. Small leaks can occur without frank rupture and exsanguination. Small aortic leaks may be seen as fluid or hematoma in the abdomen. Often, these collections are seen within the psoas muscle or obscuring the anterior surface of the psoas[15].

In cases of impending rupture, prompt intervention is necessary. Emergent consultation with a vascular surgeon is required to establish a plan for definitive therapy. Blood pressure control is important for stabilization of unruptured aneurysms[2]. Although counterintuitive, physicians should consider deferring fluid resuscitation if the patient is conscious and systolic pressure is at least 50–70 mmHg[16]. Resuscitation with large fluid volume may result in rapid exsanguination into the abdominal cavity.

Larger transfusion volume requirement as well as large retroperitoneal hematomas have been associated with increased risk for abdominal compartment syndrome, characterized by intra-abdominal hypertension and multi-organ dysfunction[16].

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